



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 2, 2013

Mr. Adam C. Heflin
Senior Vice President
and Chief Nuclear Officer
Union Electric Company
P.O. Box 620
Fulton, MO 65251

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE
CALLAWAY PLANT, UNIT 1, LICENSE RENEWAL APPLICATION, SET 29
(TAC NO. ME7708)

Dear Mr. Heflin:

By letter dated December 15, 2011, Union Electric Company (Ameren Missouri) (the applicant) submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54) for renewal of Operating License No. NPF-30 for the Callaway Plant, Unit 1 (Callaway). The staff of the U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing this application in accordance with the guidance in NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants." During its review, the staff has identified areas where additional information is needed to complete the review. The staff's requests for additional information are included in the enclosure. Further requests for additional information may be issued in the future.

Items in the enclosure were discussed with David E. Shafer, of your staff, and a mutually agreeable date for the response is within 45 days from the date of this letter. If you have any questions, please contact me by telephone at 301-415-2946 or by e-mail at Samuel.CuadradoDeJesus@nrc.gov.

Sincerely,

A handwritten signature in black ink, which appears to read "Samuel Cuadrado de Jesús", is written over a printed name.

Samuel Cuadrado de Jesús, Project Manager
Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-483

Enclosure:
As stated

cc: Listserv

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/RA/

Samuel Cuadrado de Jesús, Project Manager
Projects Branch 1
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ADAMS Accession No.: ML13330A689

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DATE	11/26/2013	11/27/2013	12/2/2013	12/2/2013	12/2/2013

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CALLAWAY PLANT, UNIT 1

LICENSE RENEWAL APPLICATION

REQUEST FOR ADDITIONAL INFORMATION, SET 29

RAI B2.1.6-4d

Background:

Generic Background Information – The Nuclear Regulatory Commission's (NRC's) position regarding implementation of recommended inspection and evaluation (I&E) criteria from the MRP-227-A report as part of a plant-specific aging management program (AMP) for reactor vessel internal (RVI) components is given in NRC Regulatory Issue Summary (RIS) No. 2011-07, "License Renewal Submittal Information for Pressurized Water Reactor Internals Aging Management," dated July 21, 2011. The RIS recommends that the review of the I&E bases for Category D pressurized-water reactor (PWR) facilities be assessed as part of the review of the applicant's AMP for its RVI components, including the bases for resolving any applicant/licensee action items (A/LAIs) on the MRP-227-A I&E methodology that are applicable to the design of the RVI components at the facility. These A/LAIs are identified in the NRC's revised safety evaluation (SE, Rev. 1, dated December 16, 2011) on the MRP-227-A I&E methodology. According to RIS No. 2011-07, Callaway Plant, Unit 1 (Callaway) is categorized as a Category D facility, which applies to PWR applicants that either will be submitting a license renewal application (LRA) that is based on the recommended criteria in NUREG 1801, "Generic Aging Lessons Learned (GALL) Report," Revision 2, or currently have GALL Report Revision 2 based LRAs pending an NRC review.

Plant-Specific Background Information – The staff's understanding is that the current licensed core power level for Callaway is set at 3565 MWt, as approved in the NRC's license amendment and safety evaluation of March 30, 1988, which was issued on the 4.5 percent stretch power uprate request for Callaway (ADAMS Accession No. ML021650524).

In A/LAI No. 1, the staff requested that applicants with a PWR design provide a demonstration that the bases and assumptions for the I&E methodology in Topical Report MRP-227-A are applicable and bounding for the design of the RVI components at the applicant's plant. The applicant responded to the request in A/LAI No. 1 in the applicant's response to RAI B2.1.6-4a which was provided in Ameren Letter No. ULNRC-05950, dated January 24, 2013.

In its January 24, 2013, response letter to RAI B2.1.6-4a, the applicant provided the following LRA commitment (as given in Commitment No. 4 in LRA UFSAR Supplement Table A4-1) as the basis for resolving the request in A/LAI No. 1:

Each applicant/licensee is responsible for assessing its plant's design and operating history and demonstrating that the approved version of MRP-227 is applicable to the facility. Each applicant/licensee shall refer, in particular, to the assumptions regarding plant design and operating history made in the FMECA and functionality analyses for reactors of their design (i.e., Westinghouse, CE, or B&W) which support MRP-227 and

ENCLOSURE

describe the process used for determining plant-specific differences in the design of their RVI components or plant operating conditions, which result in different component inspection categories. The applicant/licensee shall submit this evaluation for NRC review and approval as part of its application to implement the approved version of MRP-227.

Issue:

Since Callaway is a RIS 2011-07 Category D plant, the resolution of A/LAI No. 1 needs to be resolved as part of the staff's review of the Callaway LRA and PWR Vessel Internals Program.

Request:

- (a) Clarify whether the design of RVI components at Callaway includes any non-welded or bolted austenitic stainless steel components whose design stresses are greater than 30 ksi and whose materials were cold worked to 20 percent or greater cold-work levels. If so, justify why the current I&E bases in MRP-227-A report are sufficient to provide for management of cracking or other applicable aging effects in these non-welded components. Otherwise, clarify and justify how the MRP-227-A report I&E bases for these RVI components will be adjusted as part of the applicant's response to the NRC's request in A/LAI No. 2.
- (b) Clarify whether Ameren Missouri has ever utilized an atypical fuel design or fuel management protocols that could make the assumptions in MRP-227-A on core design, core loading, and core leakage patterns non-representative for the Callaway RVI design, including those that might have been approved for the facility under the NRC's process for reviewing power uprate/power change license amendment requests. If so, justify why the current I&E bases in MRP-227-A report are sufficient to provide for management of cracking and other applicable aging effects in the plant's RVI components based on the actual fuel loading patterns and fuel power conditions that are approved in the current licensing basis. Otherwise, clarify and justify how the MRP-227-A report I&E bases for these RVI components will be adjusted as part of the applicant's response to the NRC's request in A/LAI No. 2.

RAI 3.3.2-2

Background:

By letter dated August 29, 2013, the LRA was amended to include submerged carbon steel and stainless steel closure bolting associated with pumps in the essential service water, service water, fire protection, emergency diesel engine fuel oil storage and transfer, oily waste, and floor and equipment drain systems. The bolting is managed for loss of material and loss of preload.

- The Open-Cycle Cooling Water System Program is proposed to manage loss of material of the submerged closure bolting exposed to raw water in the essential service water system.

LRA Section B2.1.10 states that routine inspections and maintenance ensure that corrosion is managed.

- The Fuel Oil Chemistry and One-Time Inspection programs are proposed to manage loss of material of the submerged closure bolting exposed to fuel oil in the emergency diesel engine fuel oil storage and transfer system. LRA Section B2.1.16 states that fuel oil chemistry is maintained to reduce contaminants and visual inspections are performed on the internal surfaces of the emergency fuel oil system storage tanks and day tanks during periodic draining. In addition, a one-time inspection is performed to confirm the effectiveness of the Fuel Oil Chemistry Program.
- The External Surfaces Monitoring of Mechanical Components Program is proposed to manage loss of material of the submerged closure bolting exposed to either raw water or waste water in the remaining systems. LRA Section B2.1.21 states that surfaces that are not readily visible during plant operations and refueling outages are inspected when they are made accessible and at intervals that would ensure the components' intended functions are maintained. Accessible surfaces are visually inspected at least every refueling outage.
- The Bolting Integrity Program is proposed to manage loss of preload of all submerged bolting exposed to raw water, fuel oil, or waste water. LRA Section B2.1.8 states that inspection activities for bolting in a submerged environment are performed in conjunction with associated component maintenance activities.

The GALL Report recommends that loss of material and loss of preload of pressure-retaining closure bolting be managed with GALL Report AMP XI.M18, "Bolting Integrity". GALL Report AMP XI.M18 includes preventive measures to minimize loss of preload, such as proper torquing of bolts and checking for uniformity of gasket compression. AMP XI.M18 also recommends periodic inspections (at least once per refueling cycle) of closure bolting for signs of leakage to ensure the detection of age-related degradation due to loss of material and loss of preload. GALL Report AMP XI.M1 "ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD," supplements AMP XI.M18 with ASME Code inspections of closure bolting, as appropriate.

Issue:

It is not clear to the staff that the submerged closure bolting will be inspected with effective techniques or with sufficient frequency such that loss of material and loss of preload can be detected prior to loss of intended function. Given the difficulty of detecting leakage of submerged bolted connections, it is not clear what parameters will be monitored to detect loss of material and loss of preload. In addition, while GALL Report AMP XI.M18 recommends inspections at least once per refueling cycle, the proposed AMPs do not state minimum inspection frequencies for submerged bolting.

Request:

For the submerged closure bolting associated with pumps in the essential service water, service water, fire protection, emergency diesel engine fuel oil storage and transfer, oily waste, and floor and equipment drain systems:

- (a) State the parameters that will be inspected and how the inspection of these parameters will be capable of detecting both loss of material and loss of preload. Clarify whether inspections will be performed in the submerged environment or when the associated pumps are removed from the submerged environment.
- (b) State the minimum inspection frequencies and the justification for those frequencies. If inspections are to be performed during maintenance, include information such as historical maintenance intervals and planned preventive maintenance activities. If inspection intervals are based on an evaluation (as discussed in the External Surfaces Monitoring of Mechanical Components Program description), state the inputs into the evaluation, considering that inspections of comparable accessible components with the same material and environment may not be available.

Letter to A. Heflin from S. Cuadrado de Jesus dated December 2, 2013

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